

feather; and the practices of keeping the birds on perches and of tying up their tails were already known. Such manipulation as is described would be extremely likely to result in the pulling out of the feathers concerned altogether, for all fanciers are well aware that a growing feather is only too easily extracted or knocked out, often to their disappointment.

Moreover, manipulation of the *tail*-feathers, even if it be really practised with the result described, would not account for the likewise abnormal elongation of the saddle-feathers or rump-hackles, or for the fact that the tail-feathers and tail-coverts of the hens of this breed are also slightly elongated, as may be seen in the Natural History Museum specimen.

That a breed of ornamental poultry with the hackles and tail-feathers abnormally elongated could be produced by continual selection of variations in the right direction no breeder would doubt, and so the living specimens of long-tailed fowls one sees in Europe present no special difficulty. Indeed, even the goose, a bird, as Darwin remarked, of singularly inflexible organisation, has produced a breed with abnormally lengthened plumage—the well-known Sebastopol goose.

The difficulty mentioned by Mr. Cunningham, that European specimens of the long-tailed fowls do not approach the length of feather seen in Japanese examples, is undoubtedly a real one. But a simpler explanation than the very unlikely one given by that gentleman would be that the true long-tailed breed is the offspring of a "sport" endowed with more or less continuously-growing feathers, analogous to the rootless teeth occurring in so many mammals, and that the European specimens fail to produce such feathers either on account of a different environment, which is known to have an influence on the growth of feathers, or because they are not good examples of the breed.

It may be objected that continuously-growing feathers are not known to exist in wild birds; but neither do we find in these the duplicated hallux, or the very heavy feathering of the feet, both of which points occur in domestic fowls, and the last in pigeons also.

As to the inheritance of acquired characters, the annals of the poultry fancy furnish no evidence of this, so far as I am aware, nor do they encourage a belief in the theory that the naked head-appendages of the fowl, and its long hackles, are due to stimulation caused by fighting. For the most pugnacious of all breeds, the Aseel of India, has the comb and wattles almost rudimentary, and the hackles, like the rest of the plumage, unusually short and scanty. The same remark applies to the allied Malay or Chittagong breed, while the old English fighting game was hardly modified from the jungle-fowl, and certainly has not a large comb. On the other hand, the large-combed breeds of the Spanish type are not particularly pugilistic, and the size of their head-appendages is recognised by fanciers to be due to selection. So much for the supposed effects of stimulation on living structures.

It may not be irrelevant here to mention a case of manipulation by oriental fanciers which recently came under my notice in India. I had observed some red or chestnut-coloured pigeons with white bars on the wing, and asked my friend Mr. W. Rutledge, who has been a dealer and fancier for nearly half a century, to what breed these birds belonged. He replied that they were of no breed, but that the marking in question was produced by plucking out the feathers constituting the bars three times, when they would be produced white, as I had seen them. But, he added, the birds would not breed young resembling them in this point. I have thought this instance worth recording as illustrating the lengths to which some Eastern bird-fanciers will go, and as showing that experienced men are well aware that acquired characters are not inherited. FRANK FINN.

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#### Decomposition of Copper Oxide.

In the course of some recent experiments which involved the heating of copper wires in vacuo to temperatures of 1000° or 1050°, several facts were noticed which seem to me worthy of record and of further investigation.

The wires in question were heated in a porcelain tube 12 inches long, the lowest quarter of which was at a uniform temperature, the maximum, while above this the temperature gradually fell off till it reached that of the room.

It was noticed that whenever the vacuum had not been as good as usual the consequent oxidation of the copper in the hot end

of the tube did not extend over the whole length of heated wire, but that  $\frac{3}{4}$  inch or so of wire was perfectly bright, with considerable oxidation both above and below the bright region.

The temperature of that part of the wire at which brightness occurred was about 950° C. At first sight it appears from this that copper oxide, probably the black variety, decomposes somewhere in the neighbourhood of 950°, but recombines again at a higher temperature.

Another possibility is that the change is connected with the formation of the red oxide, though the appearance of the bright portions of the wires does not favour this idea.

Volatilisation of the metal itself appears to go on at the bright parts, but it is difficult to account for the observed phenomena on an hypothesis of volatilisation alone.

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PHILIP HARRISON.

#### The Subjective Lowering of Pitch.

As a question arising out of Mr. Harding's letter (p. 103), it would be interesting to know what is the effect produced by sounding a note loud enough to produce the subjective distortion, while at the same time the note to which it appears to be flattened is sounded more quietly. I suppose discord would be inevitable, but possibly a musical ear would be able to judge whether subjective distortion was prevented in the loud, or produced in the softer, note.

Mr. Allen's argument (p. 182) may, I think, be disposed of in the following manner. He states that the singer should be conscious of flatness. Now if he is singing with an instrument, the note he sings is the only one he can possibly sing without being conscious of discord. If he sings so much higher that his distorted note is depressed till it sounds (in the absence of the instrument) as though it were the correct note, he produces discord with the instrument. His only course is to sing the note of the instrument, reinforce it, and so unconsciously cause the subjective depression of both. I am writing in ignorance of whether the effect is observed in unaccompanied singing and solos on the violin. E. C. SHERWOOD.

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#### A Curious Phenomenon.

A CURIOUS phenomenon occurred to some volunteers while on outpost duty on the Delagoa Bay Railway in the Transvaal.

A search-light was fixed up in the station, which was used nightly in scanning the wide stretches of veldt. We were on solitary outpost duty about three miles from the station, and on the still silent nights which are frequently experienced in the clear atmosphere of the high veldt we distinctly heard a low "purring" sound as the ray of light of the station passed over us. As the light approached us one could hear the sound gradually increasing, being loudest as it switched over us and passing away into the nothingness of the silent night. We were too far off the station to hear any vibrations from the mechanism of the search-light, and we all came to the conclusion (being a collection of unscientific men) that the high velocity of the light waves created a sound audible to our ears. On other nights when there was only a slight breeze no noise could be detected.

Can any one of NATURE's readers tell me if this is a known physiological effect?

STANLEY B. HUTT.

Broxbourne, June 20.

#### THE ANTARCTIC EXPEDITION.

THE instructions to the commander of the National Antarctic Expedition—*verbosa et grandis epistola*—have now been published, together with a similar document, of much greater brevity, addressed to the director of the civilian scientific staff. Most of the former, much even of the latter, would not interest our readers, so we print only a few extracts relating more immediately to the matters recently under discussion. We take first (though not in order) the following clause:—

The *Discovery* is not one of His Majesty's ships, but is registered under the Merchant Shipping Act, 1894, and is governed

by it. Copies of this Act will be supplied to you. You will see that the officers and crew sign the ship's articles as required by the Act. The scientific staff will not sign articles, but are to be treated as cabin passengers. You must be careful not to take more than twelve persons as passengers.

So it is now quite clear that the *Discovery* is not on His Majesty's service in any sense of this phrase; the demand also that the members of the civilian staff should sign articles has been dropped as impracticable; so we fail to see why an officer of the Royal Navy without any experience of Polar exploration should have been preferred for the command to a captain in the merchant service familiar with work of this character and less likely to stand upon the dignity of his rank.

We observe also that the civilian director is carefully warned off from interference with all scientific work done by the officers of the ship by the following clause:—

The scientific work of the executive officers of the ship will be under your immediate control, and will include magnetic and meteorological observations, astronomical observations, surveying and charting, and sounding operations.

We may remark that, throughout, the instructions indicate that the framers of them are not quite easy in their minds, for it is solemnly impressed on the commander that he has a grand chance which he must on no account throw away, and advice is given to both which might be put in the homely form, "We hope you will be good boys and not quarrel."

We pass on to the definitions of the objects of the expedition:—

The objects of the expedition are (a) to determine, as far as possible, the nature, condition and extent of that portion of the South Polar lands which is included in the scope of your expedition; and (b) to make a magnetic survey in the southern regions to the south of the 40th parallel, and to carry on meteorological, oceanographic, geological, biological and physical investigations and researches. Neither of these objects is to be sacrificed to the other.

Geographical discovery and scientific exploration by sea and land should be conducted in two quadrants of the four into which the Antarctic regions are divided for convenience of reference, namely the Victoria and Ross Quadrants. It is desired that the extent of land should be ascertained by following the coast lines, that the depth and nature of the ice-cap should be investigated, as well as the nature of the volcanic region, of the mountain ranges, and especially of any fossiliferous rocks.

Whenever it is possible, while at sea, deep-sea sounding should be taken with serial temperatures, and samples of seawater at various depths are to be obtained for physical and chemical analysis. Dredging operations are to be carried on as frequently as possible, and all opportunities are to be taken for making biological and geological collections.

Whether the *Discovery* should or should not winter in the ice is left to the discretion of the commander. In that event the following direction is given:—

Your efforts, as regards geographical exploration, should be directed, with the help of depôts, to three objects, namely, an advance into the western mountains, an advance to the south, and the exploration of the volcanic region.

And it is kindly added:—

The director and his staff shall be allowed all facilities for the prosecution of their researches.

In the event of not wintering, the commander is instructed to land a party between Cape Crozier and Cape Johnson, if a suitable place can be found. In regard to magnetic observations special directions are given, from which it appears that the authors of the instructions have taken pains that at any rate this branch of science shall not be neglected.

The instructions to the director of the civilian scientific

staff cannot be said to err on the side of precision. For information as to the objects of the expedition they refer him to the instructions given to its commander, which, it is said, will also suffice to indicate his position relatively to the latter. The director can certainly claim to be unfettered as to his methods and objects of work, for there is no direct mention of anything but the disposal of the results. It might, however, have been well for those responsible for these instructions to have indicated the points on which information was especially desired. Still, they have not omitted the precaution of informing the director and members of the civilian staff that they join the expedition at their own risk.

But who is this director? The instructions name two officials, Mr. Hodgson (biologist), Mr. Shackleton (physicist), and the two medical officers, Dr. Koettlitz and Dr. Wilson, who will act respectively as botanist and zoologist when their other duties permit. We are aware that Mr. George Murray will occupy the position of director at the outset of the expedition, but it has been publicly stated that he will not accompany it beyond Australia or New Zealand. Is he to devote himself during his voyage out to training up one of these four in the way that he should afterwards go as his successor, trusting, as with a plant, to quick development under the tropical sun? or is there still a lingering hope of picking up a director somewhere in the Antipodes?—that would indeed be a feat worthy of the *Discovery*!

Magnetic work, as we have said, is happily not neglected. Biological work also, so far as it can be done from the ship, will probably receive attention; how far it will be carried out on land must be left, as we have seen, to the chapter of accidents. Geology has to be content with a bare mention, and the Antarctic ice is just named. Yet a thorough study of its phenomena should have been made prominent among the objects of this expedition. The ice cap of the Antarctic region, as has long been known, is in all probability on a much grander scale than even in Greenland. It is as large as, if not larger than, any which existed in northern latitudes during the glacial epoch. Here, then, if anywhere, information can be obtained as to the work and the indications of such an ice-cap. Certainly these questions will not be solved, nor "the depth and nature of the ice-cap" investigated, by following the coast-line or by anything less than by the researches of a party stationed for a considerable time on the land. But to make information on these questions really valuable it must have been collected by one who is thoroughly familiar with them and can distinguish between trivial and important phenomena. Can we say that any member of the staff possesses these qualifications? Indeed, as we see from the description quoted above, no one of the present staff even claims to be a geologist.

One other point deserves notice. In a covering letter, signed by the chairman of the final committee of the Royal and Geographical Societies, sent with the instructions to their presidents (to which, as it is not marked confidential, we presume we may refer), we find a statement that the instructions have been settled in their present form in consequence of Prof. Gregory's resignation. The reason for bringing in his name is not easy to discover, unless it be that the committee felt ill at ease; for it is a wise policy, when conscious of being in a very questionable position, to hint to all the world that the other party is to blame. Any such innuendo Prof. Gregory can afford to disregard. His actions have been throughout above board and consistent. The Royal Society, as we have already pointed out, has displayed, through its representatives, little care for the interests of science and a lack of moral courage in fighting its battles. We can now only hope for the best; but we fear events will prove that these things also are better managed in Germany than in England.